

CLAIMS

At least the following is claimed:

- 1 1. A composition, comprising:
 - 2 a basic component;
 - 3 an acidic component;
 - 4 at least one acrylate component;
 - 5 oxidizing agent;
 - 6 reducing agent; and
 - 7 a binder comprising a viscosity modifier and a surface tension
 - 8 modifier, the binder capable of stimulating a reaction between the basic
 - 9 component and the acidic component and wherein a portion of the
 - 10 binder is capable of undergoing a polymerization reaction between at
 - 11 least one acrylate component, the oxidizing agent, and the reducing
 - 12 agent, wherein the polymerization reaction being initiated by the redox
 - 13 reaction between the oxidizing agent and the reducing agent.
- 1 2. The composition of claim 1, wherein the basic component is selected
 - 2 from metal oxides, metal oxide salts, reactive glasses, and combinations
 - 3 thereof.
- 1 3. The composition of claim 1, wherein the acidic component is selected
 - 2 from alginic acid, gum arabic, nucleic acids, pectins, proteins,
 - 3 carboxymethylcellulose, ligninsulphonic acids, acid-modified starch,
 - 4 polyacrylic acid, polymethacrylic acid, polymethacrylic acid copolymer
 - 5 with methyl methacrylate, polyvinyl sulphonic acid, polystyrene sulphonic
 - 6 acid, polysulphuric acid, polyvinyl phosphonic acid, polyvinyl phosphoric
 - 7 acid, the homo- and copolymers of unsaturated aliphatic carbonic acids,
 - 8 the anhydrides of the unsaturated aliphatic carbonic acids, and
 - 9 combinations thereof.

- 1 4. The composition of claim 1, wherein at least one acrylate component is
2 selected from mono-functional acrylates, di-functional acrylates, tri-
3 functional acrylates, tetra-functional acrylates, and combinations thereof.

- 1 5. The composition of claim 1, wherein the oxidizing agent selected from
2 persulphates, benzoyl peroxides, hydroperoxides, cobalt (III) salts, iron
3 (III) salts, hydrogen peroxides, and combinations thereof.

- 1 6. The composition of claim 1, wherein the reducing agent is selected from
2 water-soluble amines, metal salts, hydrazines, and combinations thereof.

- 1 7. The composition of claim 1, wherein the viscosity modifier is selected
2 from ethanol, hexanediol, pentanediol, ethylene glycol diacetate,
3 potassium aluminum sulphate, isopropanol, ethylene glycol monobutyl
4 ether, diethylene monobutyl ether, dodecyldimethylammonium
5 propoane sulphonate, glycerine triacetate, ethyl acetoacetate, polyvinyl
6 pyrrolidone, polyethylene glycol, polyacrylic acid, sodium polyacrylate,
7 and combinations thereof.

- 1 8. The composition of claim 1, wherein the surface tension modifier is
2 selected from ethanol, hexanediol, pentanediol, tergitols, ethylene
3 glycols, fluorosurfactants, and combinations thereof.

1 9. The composition of claim 1, wherein the basic component is from about
2 20% to 90% by weight of the solid freeform composition, the acidic
3 component is from about 1% to 40% by weight of the solid freeform
4 composition, the at least one acrylate component is from about 5% to
5 50% by weight of the solid freeform composition, the oxidizing agent is
6 from about 0.1% to 10% by weight of the solid freeform composition, the
7 reducing agent is from about 0.1% to 10% by weight of the solid freeform
8 composition, the viscosity modifier is from about 1% to about 30% by
9 weight of the solid freeform composition, and the surface tension
10 modifier is from about 0.01% to about 30% by weight of the solid
11 freeform composition.

1 10. The composition of claim 1, wherein the binder is a polar binder.

1 11. The composition of claim 10, wherein a powder includes the basic
2 component, the acidic component, a polyacrylate component, and the
3 oxidizing agent; and wherein the polar binder includes a polar solvent, an
4 acrylate component, the surface tension modifier, the viscosity modifier,
5 and the reducing agent.

1 12. The composition of claim 10, wherein a powder includes the basic
2 component, a polyacrylate component, and the oxidizing agent; and
3 wherein the polar binder includes a polar solvent, the acidic component,
4 an acrylate component, the surface tension modifier, the viscosity
5 modifier, and the reducing agent.

1 13. The composition of claim 10, wherein a powder includes the basic
2 component, a first acidic component, a polyacrylate component, and the
3 oxidizing agent; and wherein the polar binder includes a polar solvent, a
4 second acidic component, an acrylate component, the surface tension
5 modifier, the viscosity modifier, and the reducing agent.

- 1 14. The composition of claim 1, further comprising components selected
2 from a retardant, an inhibitor, a wetting agent, a colorant, an organic
3 filler, an inorganic filler, and combinations thereof.
- 1 15. The composition of claim 14, wherein the organic filler is selected from
2 polymethylmethacrylate, polyhydroxyethylmethacrylate, and
3 combinations thereof.
- 1 16. The composition of claim 14, wherein the inorganic filler includes fumed
2 silica.
- 1 17. The composition of claim 1, further comprising:
2 a light sensitive radical initiator, wherein a polymerization reaction
3 between the at least one acrylate component and the light sensitive
4 initiator occurs upon exposure to light energy.
- 1 18. The composition of claim 17, wherein the light sensitive initiator is
2 selected from ultraviolet initiators, visible initiators, and combinations
3 thereof.
- 1 19. The composition of claim 17, wherein the basic component is from about
2 20% to 90% by weight of the solid freeform composition, the acidic
3 component is from about 1% to 40% by weight of the solid freeform
4 composition, the at least one acrylate component is from about 5% to
5 50% by weight of the solid freeform composition, the oxidizing agent is
6 from about 0.1% to 10% by weight of the solid freeform composition; the
7 reducing agent is from about 0.1% to 10% by weight of the solid freeform
8 composition, and the light sensitive initiator is from about 0.01% to 5% by
9 weight of the solid freeform composition.

- 1 20. The composition of claim 17, wherein the binder is a polar binder.
- 1 21. The composition of claim 20, wherein a powder includes the basic
2 component, the acidic component, a polyacrylate component, and the
3 oxidizing agent; and wherein the polar binder includes a polar solvent, an
4 acrylate component, the reducing agent, the surface tension modifier, the
5 viscosity modifier, and the light sensitive initiator.
- 1 22. The composition of claim 20, wherein a powder includes the basic
2 component, a polyacrylate component, and the oxidizing agent; and
3 wherein the polar binder includes a polar solvent, the acidic component,
4 an acrylate component, the reducing agent, the surface tension modifier,
5 the viscosity modifier, and the light sensitive initiator.
- 1 23. The composition of claim 20, wherein a powder includes the basic
2 component, a first acidic component, a polyacrylate component, and the
3 oxidizing agent; and wherein the polar binder includes the polar solvent,
4 a second acidic component, an acrylate component, the reducing agent,
5 the surface tension modifier, the viscosity modifier, and the light sensitive
6 initiator.
- 1 24. The composition of claim 17, further comprising components selected
2 from a retardant, an inhibitor, a wetting agent, a colorant, an organic
3 filler, an inorganic filler, and combinations thereof.
- 1 25. The composition of claim 24, wherein the organic filler is selected from
2 polymethylmethacrylate, polyhydroxyethylmethacrylate, and
3 combinations thereof.
- 1 26. The composition of claim 24, wherein the inorganic filler includes fumed
2 silica.

- 1 27. The composition of claim 1, wherein the binder is a non-polar binder.
- 1 28. The composition of claim 17, wherein the binder is a non-polar binder.